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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/935,510	08/23/2001	Julius L. Goldstein	16918-8183	9482

21888 7590 11/02/2004
THOMPSON COBURN, LLP
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ST LOUIS, MO 63101

EXAMINER

PENDLETON, BRIAN T

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/935,510

Applicant(s)

GOLDSTEIN, JULIUS L.

Examiner

Brian T. Pendleton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-19, 21-32 and 34-74 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 59 and 66 is/are allowed.
- 6) ☒ Claim(s) 2, 3, 6-16, 21, 28-32, 34, 35, 38, 39, 41, 43, 45-51, 55-58, 60-65 and 67-74 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 17-19, 22-27, 36, 37, 40, 42, 44 and 52-54 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/12/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The declaration under 37 CFR 1.132 filed 7/12/2004 is insufficient to overcome the rejection of the claims based upon the Cummins reference as set forth in the last Office action because: Applicant has not convinced the Examiner that the claim language as set forth “instantaneous compressive gain” is not read upon by Cummins, which uses an amplifier not relying on previous inputs. While, it is noted that instantaneous compressive gain follows an input/output relationship and that the only delay is the charging of a capacitor, Applicant has not distinguished his invention by claiming anything other than an amplifier which does not rely on previous inputs, as discussed in his own specification. The declaration points out issues not relevant to the claim language, such as the trade off between slow and fast attack and release times, but does not persuade Examiner that the amplifier in Cummins, which accomplishes the same task as the amplifier claimed and described in the specification. There is no claimed specific attack or release times in the invention’s amplifier which would distinguish it over Cummins. Examiner has used a different secondary reference in the 103(a) rejection of the claims, but still depends on Cummins to meet the amplifier claimed.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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3. Claims 2, 3, 7, 13-15, 21, 30, 34, 35, 39, 45-47, 49, 50, 55, 57, 60-65 and 67-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cummins in view of White, US Patent 4,701,953. Cummins discloses a hearing amplification device with a nonlinear amplifier having a linear gain between points k_1 and k_2 and compressive gain about point k_2 . The compression threshold at point k_2 is adaptive (column 3 lines 15-18). Cummins does not disclose a band pass non-linearity channel. White discloses a hearing aid having multiple band pass filters for processing the input signal in separate frequency bands. It would have been obvious to one of ordinary skill in the art at the time of invention to use band pass filters and separately adjust gain in distinct frequency bands, as taught by White, for the purpose of reducing spectral distortion caused by one channel hearing aid processors. The combination of Cummins and White comprises a memory-less amplifier which does not rely on previous inputs. There is a negligible attack delay of 1 millisecond, which reads on the claim language. Claims 2, 21, 34, 35, 60, 63, and 64 are met. Also, column 9 lines 29-34 and figure 10 of Cummins discloses that K_2 (which is continuous with respect to K_1) can be varied as a function of the signal and noise estimates. Thus, independent claims 55, 67, 71, 73 and dependent claims 3, 57, 61 and 62 are met. As to claims 7 and 39, there exists a sharp transition between the linear gain section and the compressive gain section. As to claims 13 and 30, White teaches a plurality of channels. Cummins et al, being modified according to the teachings of White, would have a unique compression threshold in each channel and the knee point K_2 , would be adjusted according to signal and noise level estimates in each channel, thereby meeting claims 14, 15 and 45. Regarding claims 46, 47, 49 and 50, the processor 50 is a digital signal processor. Cummins does not teach that the signal processing is in analog. In the art of signal processing, digital and

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analog methods were well known and easily implemented. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use analog signals in the invention of Cummins et al and White, meeting claim 65. As to claims 68, 69 and 74, there is disclosed a plurality of filters in White. As to claims 70 and 72, Cummins is digital and the gain varies sample by sample once the gain is determined (i.e. instantaneous). The attack time is not instantaneous as the apparatus of Cummins has a time constant to determine the input signal's amplitude.

4. Claims 6, 31, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cummins et al in view of White as applied to claims 3, 21 and 35 above in further view of Frindle et al. Cummins et al and White disclose a hearing aid having a microphone 30 (transducer), a processor containing a digital signal processor 50 which does non-linear amplification and noise and signal tracking in a plurality of frequency bands, whereby the amplification has a compressed gain region above knee point K2 which is varied according to signal and noise level estimates. The combination does not teach that the transition between the linear and compressed gain regions is smooth. In figure 3, Frindle et al disclose an compressor amplifier with a soft knee that provides a smooth transition between the linear region A and compressed region B. In column 2 lines 27-37, it was taught that the smooth transition reduces audible distortion, therefore one of ordinary skill in the art would have been motivated to provide that feature in any compressor. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to use the teachings of Frindle et al and provide a smooth transition knee point in the invention described by Cummins et al and White.

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5. Claims 8, 9, 11, 12, 16, 28, 32, 41, 48, 51, 56 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cummins et al in view of White, as applied to claims 3, 14, 21 and 35 above, in further view of Armstrong et al. As stated above, the combination of Cummins et al and White discloses a hearing aid having a microphone 30 (transducer), a processor containing a digital signal processor 50 which does non-linear amplification and noise and signal tracking in a plurality of frequency bands, whereby the amplification has a linear region between points K1 and K2 and a compressed gain region above knee point K2, which is varied according to signal and noise level estimates. Cummins and White do not explicitly show a decompression threshold higher than the compression threshold whereby the gain is constant and less than the compressive gain. However that feature was standard for hearing aid compression amplifiers, as evidenced by Armstrong et al. In figures 3A and 3B, it is shown that above a decompression threshold 44 (which is higher than compression threshold 38), the gain is constant and less than the compressive gain. According to Armstrong et al, that compression transfer function was conventional in the art. It was beneficial to use such a configuration for the amplifier so that loud sound signals would not be amplified to the point of pain for the hearing aid user. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a decompressive gain function in the combination, meeting claims 8, 16, 28 and 41. As to claim 9, the knee point K2 is adjusted around the predetermined level. Regarding claim 11, Armstrong et al show square root compression in block 84. Per claim 12, the manipulation of the variable resistors change the compression threshold values of the respective compressors (see column 3 lines 3-8) in Armstrong et al. It would have been obvious to implement that feature in the combination. In figures 3A and 3B, it is shown that above a

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decompression threshold 44 (which is higher than compression threshold 38), the gain is constant and less than the compressive gain. According to Armstrong et al, that compression transfer function was conventional in the art. It was beneficial to use such a configuration for the amplifier so that loud sound signals would not be amplified to the point of pain for the hearing aid user. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a decompressive gain function in the hearing aid of Cummins et al. As to claim 17, the knee points K2 are adjusted around their predetermined levels. As to claim 32, the transition in Armstrong et al between the linear range and compressive gain is sharp. Per claims 48 and 51, it was obvious at the time of invention to use either analog or digital signal processing techniques. As to claims 56 and 58, the variable resistors of Armstrong et al are used by the user to change the threshold between at least two values.

6. Claims 10, 29, 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cummins et al in view of White in further view of Armstrong et al as applied to claims 8, 28 and 41 above, and further in view of Yanick, The combination of Cummins et al, White et al and Armstrong et al disclose a hearing aid apparatus having a plurality of frequency bands, each band having a non-linear amplifier with a linear gain region, a compression threshold at the end of the linear gain region, a compressive gain region and a decompressive gain region following the compressive gain region starting at a decompression threshold. The combination does not teach an attenuation threshold above the decompression threshold as required by claim 10. Yanick, teach a non-linear hearing aid amplifier having an attenuation threshold about 90 db as illustrated in figures 2A-2B and in tables I, II and III. The advantage of the attenuation threshold was that extremely loud sounds which would be damaging to an user's ears are attenuated. Therefore one

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of ordinary skill in the art would have been motivated to provide such a beneficial feature in the combination of Cummins et al, White et al and Armstrong et al which also has a non-linear amplifier.

Allowable Subject Matter

7. Claims 59 and 66 are allowed.
8. Claims 4, 5, 17, 18, 19, 22-27, 36, 37, 40, 42, 44, 52-54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Waldhauer, US Patent 5,488,668.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Pendleton whose telephone number is (703) 305-9509. The examiner can normally be reached on M-F 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. J. R.